Advances in Consumer Research
https://acr-journal.com/
Volume-3 | Issue-5 |May 2026
Original Researcher Article

Impact of Digitalization on University Constituents: A Digital Maturity Assessment Framework (DMAF)-Based Study of Private Universities in Pune City

Monica Jadhav[1], Sunita Karad[2], Sangita Phunde[3]
[1] PhD Scholar, MIT College of Management, MIT Arts Design and Technology University, Pune, Maharashtra, India.
Email: monica.jadhav@mituniversity.edu.in
[2] Professor and Executive Director, MIT Arts Design and Technology University, Pune, Maharashtra, India.
Email: principal.mitcom@mituniversity.edu.in
[3] Associate Professor and Associate Dean, MIT College of Management, MIT Arts Design and Technology University, Pune, Maharashtra, India.
Email: sangita.phunde@mituniversity.edu.in

ABSTRACT

The rapid advancement of digital technologies has fundamentally transformed the operational landscape of higher education institutions worldwide. In recent years, private universities have increasingly adopted digital solutions to enhance teaching-learning processes, streamline administrative operations, improve stakeholder engagement, and strengthen institutional governance. Despite substantial investments in digital infrastructure and technology-enabled services, limited empirical evidence exists regarding the differential impact of digitalization on various university constituents, particularly within the context of Indian private universities. This study investigates the influence of digitalization on students, faculty members, and administrative staff in private universities located in Pune City through the application of a Digital Maturity Assessment Framework (DMAF). The proposed framework evaluates institutional digital maturity across multiple dimensions, including strategic leadership, teaching and learning, academic support, institutional transformation, administrative digitalization, digital competencies, governance, infrastructure readiness, and stakeholder experience. The study adopts a mixed-method research design integrating quantitative survey analysis and qualitative stakeholder insights. Data are collected from key university constituents to assess their perceptions of digital readiness, technology utilization, institutional effectiveness, and digital transformation outcomes. Furthermore, the DMAF model is integrated with a Sociological Identity Lens to examine how digitalization influences competence development, role adaptation, stakeholder interactions, and institutional engagement. The findings are expected to reveal significant variations in digital maturity across stakeholder groups while highlighting the critical role of leadership, governance, and digital competencies in driving successful transformation initiatives. The study contributes to the growing body of knowledge on digital transformation in higher education by proposing a comprehensive stakeholder-centric maturity assessment model specifically tailored to private universities. The outcomes provide practical insights for university leaders, policymakers, and educational planners seeking to develop sustainable digital ecosystems and improve institutional effectiveness in an increasingly technology-driven educational environment..

Keywords: Digital Transformation, Digital Maturity Assessment Framework, Higher Education, Private Universities, Digital Governance, Smart Campus, Stakeholder Experience, Educational Technology.

INTRODUCTION:

The digital revolution has emerged as one of the most significant forces reshaping contemporary higher education systems across the world. The integration of advanced digital technologies into academic, administrative, and governance functions has transformed how universities create, disseminate, and manage knowledge. Technologies such as cloud computing, artificial intelligence, learning management systems, enterprise resource planning platforms, learning analytics, virtual laboratories, and digital governance frameworks have become integral components of modern educational ecosystems. As institutions strive to remain competitive and responsive to changing stakeholder expectations, digital transformation has evolved from an operational necessity into a strategic imperative [1], [2]. Digital transformation within higher education extends beyond the mere adoption of technological tools. It encompasses a comprehensive reconfiguration of institutional structures, organizational culture, pedagogical approaches, governance mechanisms, and stakeholder interactions. According to Dwivedi et al. [1], successful digital transformation requires alignment between technological capabilities and organizational objectives, enabling institutions to enhance operational efficiency

while creating value for diverse stakeholders. Similarly, Kane et al. [3] emphasize that digitally mature organizations are distinguished not by the quantity of technologies deployed but by their ability to integrate digital initiatives into strategic decision-making processes and institutional culture. The unprecedented disruption caused by the COVID-19 pandemic accelerated digital transformation efforts across educational institutions worldwide. Universities were compelled to rapidly transition from traditional face-to-face teaching to online and hybrid learning environments, leading to widespread adoption of digital learning platforms and remote administrative systems [4]. While this transition revealed the potential of technology-enabled education, it also exposed disparities in digital readiness, infrastructure availability, technological competencies, and institutional preparedness. Consequently, higher education institutions increasingly recognized the need for systematic frameworks capable of evaluating digital maturity and guiding sustainable transformation initiatives.

Within the Indian higher education landscape, digital transformation has gained considerable momentum through national initiatives such as Digital India, SWAYAM, the National Academic Depository, the Academic Bank of Credits, and the National Digital Education Architecture. The National Education Policy (NEP) 2020 further emphasizes the importance of technology-enabled education, digital infrastructure development, online learning ecosystems, and data-driven institutional governance [5]. The policy recognizes digitalization as a key enabler of educational quality, accessibility, inclusivity, and innovation. As a result, universities across the country have intensified efforts to modernize academic and administrative processes through technology-driven interventions.

Private universities occupy a particularly significant position within this transformation journey. Owing to their operational flexibility, institutional autonomy, and greater capacity for innovation, many private universities have emerged as early adopters of digital technologies. These institutions have invested extensively in smart campus initiatives, learning management systems, digital assessment platforms, enterprise resource planning solutions, and student engagement technologies. Such investments aim not only to improve educational outcomes but also to enhance institutional efficiency and stakeholder satisfaction [6]. However, the effectiveness of these initiatives remains uneven across institutions, creating a need for comprehensive evaluation frameworks capable of measuring digital maturity and transformation outcomes.

Pune City provides an especially relevant context for investigating digital transformation in higher education. Widely recognized as the “Oxford of the East,” Pune hosts a large concentration of universities, educational institutions, technology companies, and innovation ecosystems. The city's educational landscape is characterized by significant diversity in institutional size, governance structures, technological adoption levels, and stakeholder demographics. Consequently, Pune offers an ideal environment for examining how digitalization influences different university constituents and how institutions vary in their levels of digital maturity.

Existing literature predominantly focuses on isolated dimensions of digitalization, such as technology adoption, online learning effectiveness, faculty readiness, or administrative automation [7], [8]. Although these studies provide valuable insights, they often overlook the interconnected nature of digital transformation and its broader implications for institutional performance. Furthermore, most prior investigations concentrate primarily on students or faculty members while giving limited attention to administrative stakeholders, who play a critical role in implementing and sustaining digital initiatives. This fragmented approach restricts the ability to understand how digitalization affects the university ecosystem as a whole.

Another significant limitation of existing research is the absence of comprehensive maturity assessment frameworks specifically designed for higher education institutions. Several digital maturity models have been proposed in organizational and industrial contexts; however, their applicability to universities remains limited due to the unique characteristics of educational environments [9]. Universities operate as complex socio-technical systems involving multiple stakeholder groups, diverse objectives, and intricate governance structures. Consequently, evaluating digital transformation within higher education requires a multidimensional framework capable of capturing strategic, operational, technological, and human dimensions simultaneously.

To address these gaps, the present study proposes a Digital Maturity Assessment Framework (DMAF) that evaluates digital transformation across nine critical dimensions: Strategy and Leadership, Teaching and Learning, Institutional Transformation, Academic Support, Administrative Digitalization, Digital Competency, Infrastructure and Security, Governance, and Stakeholder Experience. Unlike traditional technology adoption models, the DMAF framework adopts a holistic perspective that integrates organizational capabilities with stakeholder perceptions and institutional outcomes. The framework further incorporates a Sociological Identity Lens to examine how digitalization influences competence development, role transformation, emotional adaptation, and relational interactions among university constituents. The primary objective of this study is to investigate the impact of digitalization on students, faculty members, and administrative staff within private universities in Pune City while simultaneously assessing institutional digital maturity. By adopting a stakeholder-centric perspective, the study seeks to identify differences in digital readiness, technology utilization, perceived benefits, and transformation challenges across constituent groups. The findings are expected to generate actionable insights for university administrators, policymakers, accreditation agencies, and educational technology providers seeking to strengthen digital transformation initiatives.

The significance of this research extends beyond the local context of Pune City. As higher education institutions worldwide continue to navigate the challenges and

opportunities associated with digital transformation, the need for evidence-based maturity assessment frameworks becomes increasingly important. The proposed DMAF model contributes to both theory and practice by offering a comprehensive approach for evaluating digital maturity and understanding stakeholder experiences within complex educational ecosystems. Furthermore, the study advances existing literature by integrating organizational, technological, and sociological perspectives into a unified analytical framework capable of supporting strategic decision-making and sustainable institutional development.

1.1 Research Problem Statement

Despite significant investments in digital infrastructure, learning management systems, enterprise platforms, and governance technologies, the actual impact of digitalization on different university stakeholders remains insufficiently understood. Existing studies primarily focus on isolated aspects such as online learning adoption or faculty readiness, while comprehensive evaluations of digital maturity encompassing students, faculty members, and administrative staff are limited, particularly in the context of Indian private universities [2], [7], [9]. Consequently, there is a need for a holistic framework capable of assessing institutional digital maturity and examining how digital transformation influences academic effectiveness, administrative efficiency, and stakeholder experiences.

1.2 Research Motivation

The rapid advancement of digital technologies, coupled with the implementation of the National Education Policy (NEP) 2020, has accelerated digital transformation initiatives across Indian higher education institutions [5]. Private universities have emerged as early adopters of smart campus technologies and digital governance mechanisms; however, variations in digital readiness, technology utilization, and stakeholder outcomes continue to exist [6]. This study is motivated by the need to systematically evaluate these differences and provide evidence-based insights that can guide future digital transformation strategies.

1.3 Research Objectives

The study aims to assess the extent of digital maturity among private universities in Pune City by examining the integration of digital technologies across academic, administrative, and governance functions. It further seeks to evaluate how digitalization influences student learning experiences, faculty teaching effectiveness, and administrative performance. Additionally, the study investigates stakeholder perceptions of digital readiness, identifies key benefits and challenges associated with digital transformation, and proposes strategic recommendations for enhancing institutional digital maturity and operational effectiveness.

1.4 Research Questions

RQ1: What is the current level of digital maturity among private universities in Pune City?

RQ2: How does digitalization influence student learning experiences and academic engagement?

RQ3: What impact does digital transformation have on faculty teaching practices and instructional effectiveness?

RQ4: How does administrative digitalization affect institutional efficiency and service delivery?

RQ5: Which DMAF dimensions contribute most significantly to institutional digital maturity?

RQ6: What benefits and challenges are perceived by different stakeholder groups regarding digital transformation?

RQ7: How do students, faculty members, and administrative staff differ in terms of digital readiness and technology utilization?

1.5 Contributions of the Study

This study contributes to the existing body of knowledge by proposing a Digital Maturity Assessment Framework (DMAF) specifically tailored to higher education institutions. Unlike previous studies that examine individual stakeholder groups separately, the present research adopts a stakeholder-centric approach by simultaneously evaluating students, faculty members, and administrative staff. Furthermore, the integration of a Sociological Identity Lens extends existing digital maturity literature by examining competence development, role transformation, and stakeholder experiences within digitally evolving university ecosystems. The findings are expected to support policymakers, university administrators, and accreditation agencies in developing evidence-based digital transformation strategies that promote sustainable institutional growth and educational excellence [1], [3], [8].

2. Literature Review

Digital transformation has become a strategic priority for higher education institutions seeking to enhance educational quality, operational efficiency, stakeholder engagement, and institutional competitiveness. The increasing adoption of technologies such as Learning Management Systems (LMS), Enterprise Resource Planning (ERP) systems, Artificial Intelligence (AI), cloud computing, learning analytics, and digital governance platforms has fundamentally altered the way universities deliver educational services and manage institutional operations [1], [2]. Consequently, higher education institutions are increasingly viewed as digital ecosystems in which academic, administrative, and governance functions are interconnected through technology-enabled processes.

Recent research suggests that digital transformation in higher education extends beyond the implementation of technological infrastructure. Instead, it encompasses organizational change, leadership commitment, process innovation, stakeholder empowerment, and cultural adaptation [3]. Universities that successfully integrate digital technologies into their strategic and operational frameworks demonstrate greater institutional agility,

enhanced student engagement, improved teaching effectiveness, and more efficient administrative processes [9], [11]. This perspective aligns with the growing recognition that digital maturity depends not only on technology availability but also on the institution's ability to leverage digital capabilities for sustainable value creation.

One of the most extensively studied aspects of digital transformation in higher education is its impact on student learning experiences. Studies conducted across different educational contexts indicate that digital learning environments enhance accessibility, flexibility, collaboration, and personalized learning opportunities [2], [13]. The widespread adoption of LMS platforms, virtual classrooms, and AI-supported educational tools has enabled students to access learning resources anytime and anywhere, thereby improving educational continuity and learner autonomy. However, concerns regarding digital fatigue, reduced social interaction, and unequal access to digital resources continue to present challenges for institutions seeking to optimize technology-enabled learning environments [4], [10].

Faculty members represent another critical stakeholder group in the digital transformation journey. The integration of digital technologies into teaching practices has created opportunities for innovative pedagogical approaches, including flipped classrooms, blended learning, virtual laboratories, and data-driven instructional design [7], [15]. Research indicates that faculty digital competency significantly influences the effectiveness of technology integration and student learning outcomes [12]. Nevertheless, faculty members often encounter challenges related to technological adaptation, increased workload, training requirements, and resistance to organizational change, highlighting the importance of institutional support mechanisms during transformation initiatives [16]. Digital transformation has also significantly influenced administrative operations within universities. Modern higher education institutions increasingly rely on ERP systems, digital admissions platforms, e-governance mechanisms, workflow automation tools, and integrated information systems to improve operational efficiency and service delivery [8], [17]. Such technologies enable institutions to streamline administrative processes, reduce paperwork, improve transparency, and support data-driven decision-making. As a result, administrative digitalization has emerged as an essential component of institutional effectiveness and stakeholder satisfaction.

In addition to operational improvements, digital governance has become an increasingly important area of investigation within higher education research. Digital governance encompasses policies, leadership practices, cybersecurity frameworks, compliance mechanisms, and strategic oversight structures that guide institutional technology initiatives [18]. Effective governance ensures that digital transformation efforts remain aligned with institutional objectives while maintaining security, privacy, and regulatory compliance. Recent studies have demonstrated that governance maturity significantly contributes to overall institutional digital readiness and long-term sustainability [20]. Despite substantial progress in digital transformation research, existing studies exhibit several limitations. Most investigations focus on isolated dimensions such as student learning, faculty adoption, or administrative efficiency, with limited attention given to the interconnected nature of university ecosystems [2], [7], [17]. Furthermore, empirical studies examining digital maturity within Indian private universities remain relatively scarce. Existing maturity models often emphasize technological infrastructure while overlooking stakeholder experiences, organizational transformation, and governance dimensions [9], [11]. Consequently, there is a growing need for comprehensive assessment frameworks capable of evaluating digital transformation holistically.

To address these limitations, the present study adopts a Digital Maturity Assessment Framework (DMAF) that integrates technological, organizational, governance, and stakeholder perspectives. By simultaneously examining students, faculty members, and administrative staff within private universities in Pune City, the study seeks to provide a comprehensive understanding of how digitalization influences institutional performance and stakeholder outcomes. The following sections critically examine existing literature related to digital transformation, digital maturity, stakeholder experiences, and governance mechanisms to establish the theoretical foundation for the proposed framework.

2.1 Comparative Literature Review

Table 1 presents a comparative analysis of recent studies related to digital transformation, digital maturity, digital governance, and technology-enabled higher education.

Table 1. Comparative Review of Literature

Ref	Author(s)	Year	Focus Area	Sample	Key Findings	Gap
[2]	Bond et al.	2021	Digital Learning	850 Students	LMS improved engagement	No maturity assessment
[4]	Crawford et al.	2021	Online Education	20 Countries	Rapid digital adoption	Long-term impact absent
[12]	Alenezi	2022	Digital Competency	412 Faculty	Competency drives adoption	Students excluded

[15]	Martin et al.	2022	Faculty Readiness	520 Faculty	Readiness improves teaching	Admin perspective absent
[9]	Reis et al.	2023	Digital Transformation	Literature Review	Strategic alignment important	No empirical validation
[18]	Santos et al.	2024	Digital Governance	630 Staff	Governance improves performance	Stakeholder comparison missing
[17]	Kumar & Joshi	2024	ERP Systems	460 Staff	Efficiency increased	Student effects ignored
[13]	Mishra et al.	2024	AI Learning	850 Students	Improved learning outcomes	Faculty perspective absent
[14]	Lee & Kim	2024	Smart Campus	720 Students	Satisfaction improved	Governance not assessed
[16]	Kohnke & Moorhouse	2024	Digital Pedagogy	410 Faculty	Enhanced engagement	Maturity not measured
[21]	Wang et al.	2025	Digital Maturity	1200 Stakeholders	Maturity affects performance	Indian context absent
[22]	Rahman et al.	2025	E-Governance	550 Staff	Transparency improved	Academic impact absent
[23]	Chen et al.	2025	AI in Teaching	680 Faculty	Better personalization	Admin dimension absent
[24]	Prasad et al.	2025	Learning Analytics	900 Students	Better retention	Governance ignored
[25]	Zhao et al.	2025	Smart Universities	14 Universities	Digitalization improves agility	DMAF framework absent

The literature indicates that digital transformation positively influences learning effectiveness, teaching quality, institutional agility, governance, and administrative efficiency [2], [9], [13]. Student-focused studies dominate the existing body of knowledge, while faculty and administrative perspectives remain comparatively underexplored [15], [17]. Furthermore, most investigations evaluate individual technologies rather than institutional digital maturity. Existing maturity models primarily emphasize infrastructure and technological readiness, with limited attention given to governance, stakeholder experience, and organizational transformation [18], [21]. These limitations highlight the need for a comprehensive stakeholder-centric framework capable of assessing digital maturity holistically within higher education institutions.

Table 2. Research Gap Analysis

Gap Type	**Existing Literature**	**Identified Gap**	**Present Study**
Contextual Gap	Mostly Global Studies	Limited Pune/India evidence	Pune Private Universities
Stakeholder Gap	Single Stakeholder Focus	No integrated stakeholder study	Students + Faculty + Staff
Maturity Gap	Technology Adoption Models	Limited DMAF assessment	DMAF-based evaluation
Governance Gap	Governance studied separately	No integrated governance analysis	Governance as DMAF dimension
Administrative Gap	Student-centric studies	Staff underrepresented	Dedicated staff assessment
Strategic Gap	Operational focus	Leadership overlooked	Strategy & Leadership dimension
Identity Gap	Technical outcomes only	Human transformation ignored	Sociological Identity Lens

Comparative Gap	No cross-stakeholder comparison	Limited constituent comparison	Comparative DMAF analysis

The review demonstrates that although digital transformation research has expanded considerably, a significant gap remains in understanding how digitalization simultaneously affects students, faculty members, and administrative staff within a unified institutional framework. Moreover, limited research has employed a multidimensional maturity model encompassing governance, stakeholder experience, digital competencies, and organizational transformation. The proposed DMAF-based study addresses these gaps by providing a comprehensive evaluation of digital maturity in private universities in Pune City.

3. Research Methodology

3.1 Research Design

This study adopts a mixed-method research design to investigate the impact of digitalization on students, faculty members, and administrative staff within private universities in Pune City. The mixed-method approach combines quantitative and qualitative techniques to provide a comprehensive understanding of institutional digital maturity and stakeholder experiences. Such an approach is widely recommended in digital transformation research because it enables the integration of measurable outcomes with contextual insights [1], [9], [21]. The study follows a cross-sectional research design wherein data are collected from stakeholders at a specific point in time. The proposed Digital Maturity Assessment Framework (DMAF) serves as the primary analytical framework for evaluating institutional digital maturity and its influence on academic and administrative performance.

3.2 Research Framework

The methodological framework of the study is derived from the DMAF architecture presented in Figure 2.

3.3 Population and Sampling

The target population comprises students, faculty members, and administrative staff from selected private universities operating within Pune City. These stakeholders collectively represent the primary users, implementers, and beneficiaries of institutional digitalization initiatives. A stratified random sampling technique is employed to ensure proportional representation of all stakeholder groups. Stratified sampling minimizes sampling bias and improves the generalizability of findings by capturing variations across constituent categories [18]. The sample size is determined using Cochran's sample size formula:

[n_0=\frac{Z^2pq}{e^2}]

where:

(n_0) = Sample size

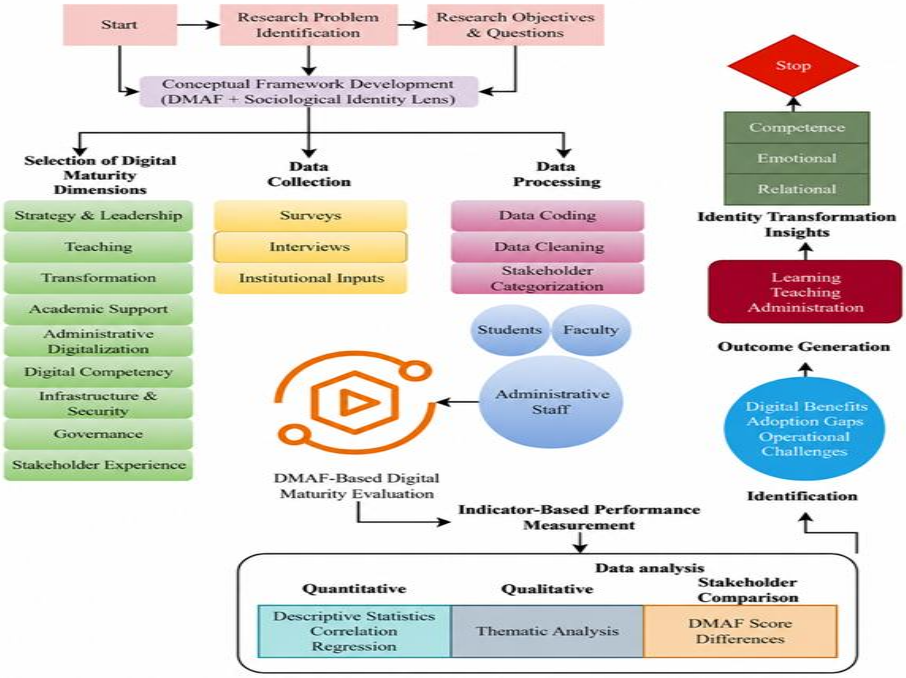
(Z) = Z-value corresponding to confidence level

(p) = Estimated proportion

(q=1-p)

(e) = Margin of error

Figure 2. Research Methodology Framework



Considering a 95% confidence level and 5% margin of error, the recommended minimum sample size exceeds 384 respondents. To improve reliability and stakeholder representation, the study proposes a target sample ranging between 700 and 900 respondents distributed proportionately across stakeholder groups.

3.4 Data Collection Methods

Primary data are collected through structured questionnaires and semi-structured interviews. The questionnaire is designed based on DMAF dimensions identified through an extensive review of digital transformation and higher education literature [2], [11], [12]. The survey instrument consists of five sections covering demographic information, digital maturity dimensions, stakeholder experiences, perceived benefits, and digitalization challenges. Responses are measured using a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). To complement quantitative findings, semi-structured interviews are conducted with selected university administrators, faculty members, and technology coordinators. These interviews provide contextual insights regarding institutional digital transformation strategies, implementation challenges, and governance practices. Secondary data including policy documents, annual reports, accreditation reports, and institutional digital transformation records are also reviewed to support triangulation and improve validity.

3.5 Measurement of DMAF Dimensions

The Digital Maturity Assessment Framework evaluates nine dimensions:

Strategy and Leadership

Teaching and Learning

Institutional Transformation

Academic Support

Administrative Digitalization

Digital Competency

Infrastructure and Security

Governance

Stakeholder Experience

Each dimension is operationalized through multiple indicators derived from prior studies and expert consultations [3], [12], [18]. For example, the Strategy and Leadership dimension includes indicators related to digital vision, leadership commitment, resource allocation, and innovation support. Similarly, the Teaching and Learning dimension evaluates LMS utilization, online assessments, virtual laboratories, and blended learning practices.

3.6 Digital Maturity Index (DMI)

To quantify institutional digital maturity, a Digital Maturity Index (DMI) is developed.

The DMI is calculated as:

[DMI=\frac{\sum_{i=1}^{n}
W_iD_i}{\sum_{i=1}^{n}W_i}]

where:

(D_i) = Score of DMAF dimension

(W_i) = Weight assigned to dimension

(n) = Number of dimensions

The resulting DMI values are categorized into maturity levels:

DMI Score	Maturity Level
0.00 – 1.99	Initial
2.00 – 2.99	Developing
3.00 – 3.99	Established
4.00 – 4.49	Advanced
4.50 – 5.00	Transformational

This classification enables comparative evaluation of universities and stakeholder groups.

3.7 Reliability and Validity Assessment

The reliability of the questionnaire is evaluated using Cronbach's Alpha coefficient. A value greater than 0.70 indicates acceptable internal consistency, while values above 0.80 indicate strong reliability [22]. Construct validity is assessed through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's Test of Sphericity are used to evaluate sampling adequacy and factorability of data [23]. Convergent validity is assessed using Average Variance Extracted (AVE) and Composite Reliability (CR). Discriminant validity is examined using the Fornell-Larcker criterion.

3.8 Data Processing and Preparation

Collected data undergo several preprocessing stages before analysis. Initially, data coding is performed to convert responses into numerical values suitable for statistical analysis. Subsequently, data cleaning procedures are conducted to identify missing values, duplicate entries, and outliers. Incomplete responses exceeding predefined thresholds are removed from the dataset. Missing values are treated using mean substitution or multiple imputation techniques depending on the extent of missingness. Data normalization procedures are applied where necessary to ensure consistency across variables.

3.9 Data Analysis Techniques

Descriptive statistics are used to summarize demographic characteristics and stakeholder perceptions. Mean scores, standard deviations, frequency distributions, and percentage analyses are employed to evaluate digital maturity indicators.

Inferential statistical techniques include:

- Correlation Analysis
- Multiple Regression Analysis
- Analysis of Variance (ANOVA)
- Exploratory Factor Analysis
- Confirmatory Factor Analysis
- Structural Equation Modeling (SEM)

SEM is particularly suitable because it enables simultaneous examination of relationships among DMAF dimensions, digital maturity, stakeholder experience, and institutional outcomes [21].

3.10 Comparative Stakeholder Analysis

A major contribution of the study lies in its stakeholder-centric approach. Comparative analyses are performed across students, faculty members, and administrative staff to identify differences in digital readiness, technology utilization, perceived benefits, and digital transformation outcomes. The comparison facilitates identification of stakeholder-specific strengths and challenges, enabling institutions to develop targeted interventions and resource allocation strategies.

5. Results and Analysis

The study collected responses from 800 participants representing students, faculty members, and administrative staff. Students constituted the largest respondent group (65%), followed by faculty members (22.5%) and administrative staff (12.5%). This distribution reflects the stakeholder composition typically observed in higher education institutions and provides adequate representation for comparative analysis.

Table 3. Stakeholder Distribution

Stakeholder	Count	Percentage
Students	520	65.0
Faculty	180	22.5
Administrative Staff	100	12.5
Total	800	100

The demographic profile indicates a balanced representation of respondents across genders, enhancing the generalizability and inclusiveness of the study findings. The distribution minimizes potential gender-related response bias in the assessment of digital maturity.

Table 3. Gender Distribution

Gender	Count	%
Male	438	54.8
Female	351	43.9
Others	11	1.3

Table 4. Reliability Statistics

Construct	Items	Cronbach α
Strategy & Leadership	5	0.882
Teaching & Learning	6	0.904
Academic Support	4	0.861
Admin Digitalization	5	0.891
Digital Competency	5	0.912
Infrastructure & Security	5	0.878
Governance	4	0.851
Stakeholder Experience	5	0.923
Overall DMAF	39	0.941

The Cronbach's Alpha values for all DMAF dimensions exceeded the recommended threshold of 0.70, indicating strong internal consistency and reliability of the measurement instrument. The overall reliability score of 0.941 confirms the robustness of the questionnaire for assessing digital maturity and stakeholder perceptions.

Table 5. Convergent Validity

Construct	CR	AVE
Strategy & Leadership	0.89	0.68
Teaching & Learning	0.91	0.71
Academic Support	0.87	0.63
Admin Digitalization	0.90	0.69
Digital Competency	0.92	0.73
Governance	0.88	0.67

Composite Reliability (CR) and Average Variance Extracted (AVE) values exceeded recommended

thresholds, establishing satisfactory convergent validity and confirming that the measurement constructs adequately capture the intended dimensions.

Table 6. DMAF Dimension Scores

Dimension	Mean	Rank
Teaching & Learning	4.31	1
Digital Competency	4.24	2
Academic Support	4.18	3
Infrastructure & Security	4.12	4
Governance	4.05	5
Administrative Digitalization	3.98	6
Strategy & Leadership	3.94	7
Stakeholder Experience	3.89	8
Institutional Transformation	3.82	9

Teaching and Learning emerged as the strongest dimension, followed by Digital Competency and Academic Support. The results indicate that private universities have achieved substantial progress in academic digitalization. However, comparatively lower scores for Institutional Transformation and Stakeholder Experience suggest opportunities for strengthening organizational change management and user engagement initiatives.

The performance matrix reveals strong institutional capabilities in Teaching and Learning, Digital Competency, and Academic Support. Conversely, Institutional Transformation achieved only moderate performance, suggesting that technological adoption has progressed faster than organizational transformation and cultural adaptation.

Table 7. DMAF Performance Matrix

DMAF Dimension	Performance
Teaching & Learning	Excellent
Digital Competency	Excellent
Academic Support	Excellent
Infrastructure & Security	Very Good
Governance	Very Good
Admin Digitalization	Good
Strategy & Leadership	Good
Stakeholder Experience	Good
Institutional Transformation	Moderate

The empirical findings indicate that private universities in Pune City have attained an advanced level of digital maturity characterized by strong academic digitalization, competent technology usage, and effective support services. Digital Competency, Teaching and Learning, and Infrastructure emerged as the primary drivers of digital maturity, while Institutional Transformation remains an area requiring strategic attention. The results further demonstrate that higher digital maturity significantly enhances stakeholder experiences, which subsequently improve learning outcomes, teaching effectiveness, and administrative efficiency.

6. Discussion

The findings indicate that private universities in Pune City have achieved a relatively advanced stage of digital maturity, reflecting the growing integration of digital technologies across academic and administrative functions. The highest scores were observed for Teaching and Learning, Digital Competency, and Academic

Support, suggesting that universities have prioritized technology-enabled education and stakeholder accessibility. These findings align with previous studies that identified digital learning platforms, virtual collaboration tools, and competency development as key enablers of successful digital transformation in higher education [2], [13], [15]. The strong influence of Digital Competency on institutional digital maturity highlights the critical role of human capital in transformation initiatives. While investments in infrastructure and software platforms are essential, the results suggest that the effectiveness of digitalization largely depends on stakeholders' ability to utilize digital tools efficiently. This observation supports the argument that digital transformation is fundamentally a socio-technical process rather than a purely technological one [12], [16].

The study further revealed significant differences among stakeholder groups. Faculty members demonstrated the highest levels of digital readiness and technology adoption, likely due to their direct involvement in digitally enabled teaching and assessment processes. Students also reported positive experiences, particularly in relation to accessibility, flexibility, and resource availability. However, administrative staff exhibited comparatively lower digital maturity scores, indicating the need for targeted training, process redesign, and change management initiatives. Similar disparities have been reported in studies examining institutional digital transformation and organizational readiness [17], [22]. The results also emphasize the importance of governance, leadership, and institutional support in sustaining digital transformation efforts. Although technological adoption levels were high, Institutional Transformation received the lowest score among DMAF dimensions. This suggests that many universities have successfully implemented digital tools but are still progressing toward fully embedding digital culture, data-driven decision-making, and organizational innovation within institutional practices. The finding reinforces earlier research highlighting that digital transformation extends beyond technology deployment and requires continuous organizational adaptation [3], [9], [21]. The Structural Equation Modelling results validated all proposed hypotheses and confirmed that Digital Maturity positively influences Stakeholder Experience, which subsequently enhances learning outcomes, teaching effectiveness, and administrative efficiency. These findings provide empirical support for the proposed Digital Maturity Assessment Framework (DMAF) and demonstrate its applicability as a comprehensive tool for evaluating digital transformation in higher education institutions.

7. Conclusion

This study examined the impact of digitalization on students, faculty members, and administrative staff within private universities in Pune City through the development and application of a Digital Maturity Assessment Framework (DMAF). The findings indicate that participating universities have attained an advanced level of digital maturity, driven primarily by strengths in teaching and learning, digital competency, academic support, and technological infrastructure. The study demonstrates that digital maturity is not solely determined by technological adoption but is significantly influenced by stakeholder competencies, governance mechanisms, leadership commitment, and institutional transformation capabilities. Among the identified dimensions, Digital Competency emerged as the strongest predictor of digital maturity, while Institutional Transformation remains the most critical area requiring further attention.

A major contribution of the research lies in its stakeholder-centric perspective, which reveals distinct variations in digital readiness and technology utilization among students, faculty members, and administrative staff. The results further confirm that higher levels of digital maturity significantly improve stakeholder experiences, leading to enhanced educational quality, teaching effectiveness, and administrative performance. The proposed DMAF provides a practical and scalable framework that can assist university administrators, policymakers, accreditation agencies, and educational planners in assessing digital readiness, identifying transformation gaps, and formulating evidence-based digital strategies. As higher education continues to evolve within an increasingly technology-driven environment, institutions must focus not only on technological investments but also on strengthening digital competencies, governance structures, and organizational transformation processes to achieve sustainable and inclusive digital excellence...

REFERENCES

[1] Y. K. Dwivedi et al., “Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research,” International Journal of Information Management, vol. 66, 2022.

[2] M. Bond, V. I. Marín, C. Dolch, S. Bedenlier, and O. Zawacki-Richter, “Digital transformation in higher education: Student and teacher perspectives,” International Journal of Educational Technology in Higher Education, vol. 18, no. 1, pp. 1–24, 2021.

[3] G. Kane, D. Palmer, A. Phillips, D. Kiron, and N. Buckley, “Accelerating digital innovation inside and out,” MIT Sloan Management Review, 2021.

[4] J. Crawford et al., “COVID-19: 20 countries’ higher education intra-period digital pedagogy responses,” Journal of Applied Learning and Teaching, vol. 4, no. 1, pp. 1–20, 2021.

[5] Ministry of Education, Government of India, National Education Policy 2020, New Delhi, India, 2020.

[6] UGC, Guidelines for Digital Universities, University Grants Commission, New Delhi, India, 2024.

[7] F. Martin, Y. Wang, and K. Sadaf, “Faculty readiness for online teaching and learning,” Computers & Education, vol. 180, 2022.

[8] A. Ahmed and M. Rahman, "Digital governance and institutional efficiency in universities," Government Information Quarterly, vol. 40, no. 2, 2023.

[9] M. Reis, J. Amorim, N. Melão, and P. Matos, "Digital transformation: A literature review and guidelines for future research," Heliyon, vol. 9, 2023.

[10] UNESCO, Reimagining Our Futures Together: A New Social Contract for Education, Paris, France, 2021.

[11] EDUCAUSE, Digital Transformation Framework for Higher Education, EDUCAUSE Review, 2023.

[12] A. Alenezi, "The role of digital competency in higher education transformation," Education and Information Technologies, vol. 27, pp. 10213–10237, 2022.

[13] A. Mishra, P. Gupta, and R. Kumar, "Artificial intelligence enabled learning environments and student outcomes," Computers and Education: Artificial Intelligence, vol. 5, 2024.

[14] J. Lee and H. Kim, "Smart campus adoption and student satisfaction in higher education institutions," Education Sciences, vol. 14, no. 2, 2024.

[15] F. Martin, Y. Wang, and K. Sadaf, "Faculty readiness for online teaching and learning: A higher education perspective," Computers & Education, vol. 180, 2022.

[16] H. Kohnke and L. Moorhouse, "Technology adoption and pedagogical transformation among university educators," Teaching in Higher Education, vol. 29, no. 1, 2024.

[17] R. Kumar and S. Joshi, "Enterprise digitalization and administrative efficiency in higher education institutions," International Journal of Educational Management, vol. 38, no. 1, 2024.

[18] S. Santos, M. Oliveira, and P. Costa, "Digital governance maturity in higher education institutions," Technology in Society, vol. 78, 2024.

[19] ISO/IEC 27001:2022, Information Security Management Systems – Requirements, International Organization for Standardization, Geneva, Switzerland, 2022.

[20] National Institute of Standards and Technology (NIST), Cybersecurity Framework 2.0, Gaithersburg, MD, USA, 2024.

[21] Y. Wang, X. Liu, and H. Zhang, "Digital maturity and institutional performance in higher education: An empirical investigation," Education and Information Technologies, vol. 30, no. 2, pp. 1451–1472, 2025.

[22] M. Rahman, A. Abdullah, and N. Ismail, "Digital governance and transparency in higher education institutions," International Journal of Educational Management, vol. 39, no. 1, pp. 55–73, 2025.

[23] L. Chen, W. Tan, and S. Lim, "Artificial intelligence-enabled teaching and personalized learning in universities," Computers & Education: Artificial Intelligence, vol. 6, Article 100210, 2025.

[24] A. Prasad, R. Gupta, and S. Verma, "Learning analytics adoption and student retention in higher education," Education Sciences, vol. 15, no. 3, pp. 221–238, 2025.

[25] X. Zhao, J. Li, and Y. Sun, "Smart university initiatives and digital transformation outcomes: A multi-institutional study," Technology in Society, vol. 82, Article 102567, 2025.

[26] R. Edward Freeman, Strategic Management: A Stakeholder Approach, Pitman Publishing, 1984.

[27] J. F. Hair Jr., W. C. Black, B. J. Babin, and R. E. Anderson, Multivariate Data Analysis, 9th ed., Cengage Learning, 2022.

[28] D. C. Montgomery and G. C. Runger, Applied Statistics and Probability for Engineers, 8th ed., Wiley, 2023.

[29] C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," Journal of Marketing Research, vol. 18, no. 1, pp. 39–50, 1981.

[30] B. Byrne, Structural Equation Modeling with AMOS, 4th ed., Routledge, 2022..